100K Hi-Cap BRIDGE SHORING

Hi-Cap Shoring System (Aluma-Systems 100K Hi-Cap Bridge Shoring) is approved for use up to a height of 100 feet. This approval is based on the results of a three dimensional computer analysis. This system will initially be furnished by the Burke Company, a subsidiary of Aluma-Systems, on a rental basis.

Falsework plans for 100K Hi-Cap Bridge Shoring should include engineering data supplied from the manufacturer. Such data should include, as a minimum, 1 sheet approximately 24" x 36" numbered CALBR-03, along with thirty-three 8 l/2" x 11" sheets dated March 93, titled "100 K Hi-Cap BRIDGE SHORING", numbered 1 of 33 through 33 of 33.

Charts on sheets 4 of 33, 5 of 33 and 6 of 33 are to be used to determine safe leg loads and allowable horizontal deflection at the tops of the towers. The maximum leg loads derived from the charts include consideration for leg load ratios, tower height, jackscrew extension length, external bracing, and limiting top of tower deflection. The Caltrans controlling horizontal load on the tower assembly, along with a safety factor of 2.5 for the tower leg loadings is included in the load charts. Controlling assumed horizontal loads transmitted to falsework components above the jack will need to be additionally considered. The charts are for tower heights up to 100 feet including jackscrew extensions for frame spacings of 6, 8, and 10 feet and up to 60 feet for frame spacings of 4 feet.

The chart on sheet 4 of 33 show curves which relate "Maximum Tower Leg Capacity" to "Tower Height" for four different levels of bracing. For each of the bracing levels a horizontal force will need to be resisted by external bracing. The horizontal force H required to be restrained is represented by the equation H = H(s) + xxxx pounds, where H(s) equals the applied horizontal force above the top of the jack screws and xxxx is in increments of 2,000 pounds for the four levels of bracing.

The horizontal bracing force will normally be accounted for with cables attached to the falsework system above the top of the tower jacks. Applicable vertical load components of the cable bracing must be included in the leg loadings.

The chart on sheet 5 of 33 contains "Capacity Reduction Factors" for towers having unequal leg loads. The chart depicts two curves which relate the "Capacity Reduction Factor" to the leg load ratio of "P(min)/P(max)" dependent upon the amount of jack extension to be used. The leg load

values derived from the "Maximum Design Leg Load" chart on sheet 4 of 33 are to be multiplied by the appropriate "Capacity Reduction Factor" as interpolated from the curves on sheet 5 of 33.

Plan sheet 6 of 33 contains a graph relating the "Horizontal Bracing Force" to the total allowable "Horizontal Deflection" at the top of the tower for various height configurations and bracing levels of the towers. It is possible to use this graph to determine the horizontal bracing force needed for a specified tower height and a given horizontal deflection at the top of the tower (the horizontal tower deflection might represent cable stretch for example).

Plan sheets 8 of 33 through 16 of 33 include example problems regarding tower stability. The example problems follow the format of example problems 8 and 9 currently in Section D of the Falsework Manual.

The remainder of the plan sheets include diagrams and section property descriptions of the various tower components.

End frame and cross bracing configuration is in the pattern of a "Z" atop a reversed "Z". This bracing pattern should distinguish Hi-Cap shoring towers from other previously approved heavy duty towers.

Temporary bracing may be connected to the towers at the locations of the coupling pins for erection stability only. Temporary bracing shall not impart loads to the towers at the time the legs are loaded. Design bracing for the loaded condition used to furnish the horizontal bracing force must be connected above the tops of the upper jack screws. Temporary bracing should be adequately slackened at the time that the loaded condition bracing is installed.

Tower foundations will have to be designed level and provide for uniform settlement under all legs of a tower.

100 K Hi-Cap Bridge Shoring towers may be used adjacent to traffic since the section modulus of a tower leg is 10.1 inches cubed which exceeds the minimum section modulus provisions in Section 51-l.O6A(3), Special Locations, of the Standard Specifications. The Falsework Manual provisions included in Section 6-1.09, Heavy Duty Shoring Systems, apply to 100 K Hi-Cap Bridge Shoring except as otherwise provided for herein.

A list of current engineering and distribution centers for Aluma-Systems is included in Falsework Memo No. 13 "Aluma-Frame Shoring Systems".